



## ***MODEL 101***

**MICROPHONE PREAMPLIFIER**

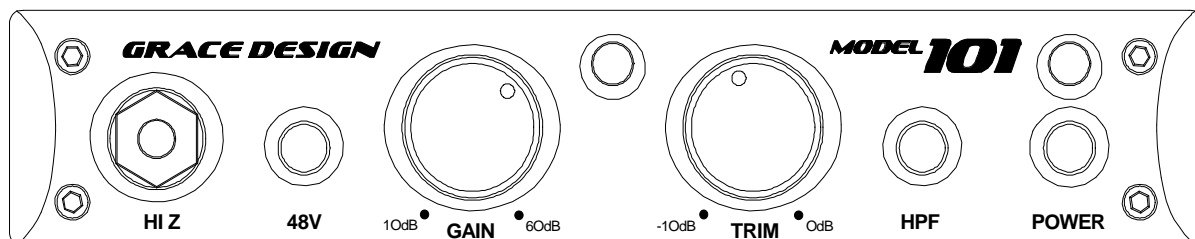
## **OWNERS MANUAL**

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***Thank you*** for purchasing the Model 101 microphone preamplifier. It is designed to be extremely reliable and easy to use. However, we ask that you take the time to familiarize yourself with some of the more important operation instructions in this manual to avoid most common user problems.

Regardless of what audio sources you plan to record, the Model 101 will faithfully serve as an invisible link between your microphone or instrument and recording device. We hope it helps you achieve a new level of excellence in your audio recordings.

Feel free to check out internet web page for the latest information regarding your preamplifier. You can always find the latest owners manuals and other technical documents at:

<b><a href="http://www.gracedesign.com/documents/docs.html">http://www.gracedesign.com/documents/docs.html</a></b>
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Grace Design has been building high quality professional audio products for the recording industry for over ten years. During this time the circuit technology in the Model 101 has evolved through a process of extensive listening, testing and refinement.

Your new Model 101 represents a dramatic breakthrough in delivering absolutely pristine audio performance, robust mechanical construction and bombproof reliability at an affordable price.

## **MODEL 101 FEATURES**

- Fully balanced transformerless mic input and high impedance instrument input
- Balanced XLR and 1/4" TRS outputs
- Ultra clean 48 Volt phantom power
- 11 position precision silver contact rotary gain switch
- High quality conductive plastic 10dB output attenuator
- 75Hz 12dB/octave transitional Thompson-Butterworth high pass filter
- two color LED peak meter shows signal present and peak conditions
- No electrolytic capacitors in the signal path.
- Minimal internal signal wiring
- Ultra high resolution transimpedance gain stage
- High precision active balanced output circuit
- Gold plated XLR input and output connectors
- Sealed gold contact relay for instrument/mic switching

## FRONT PANEL CONTROLS

**GAIN CONTROL** Each gain control has 11 positions and adjusts the voltage gain on the microphone input from 10dB to 60dB in 5dB steps. When using the instrument input, the gain range is -10dB to 40dB in 5dB steps.

**NOTE:** If you ordered the high gain version of the 101 for use with ribbon microphones, the gain range of your unit on the microphone input is 20dB to 70dB in 5dB steps and the gain range of the instrument input is 0dB to 50dB in 5 dB steps.

**TRIM CONTROL** The trim control provides 10dB of continuously variable output attenuation. In the fully clockwise position the trim is at unity (no attenuation). In the fully counter-clockwise position the trim is at -10dB. For reference, the 3 o'clock position is -4dB and the 12 o'clock position is -8dB. The trim control should be left in the fully clockwise position during normal recording.

**48V PHANTOM POWER** This switch provides 48 volts to power condenser microphones. The phantom power switch (labeled +48) connects the +48V power supply to pins 2 and 3 on the XLR input connector.

**PEAK INDICATOR** The LED peak indicator, which monitors the signal between the input and output amplifiers, illuminates the green LED at -20dBu and illuminates the red LED at +16dB (10dB before clipping). It is located between the GAIN and TRIM controls.

**HIGH PASS FILTER** (labeled HPF) Sometimes referred to as a bass roll-off, the high pass filter rolls off at 75Hz. This 12dB/octave filter employs a *transitional Thompson-Butterworth* response for the best combination of passband flatness and time domain response.

**POWER SWITCH** The power switch connects power from the DC input connector to the preamplifier circuitry. When depressed, the amber POWER LED will illuminate.

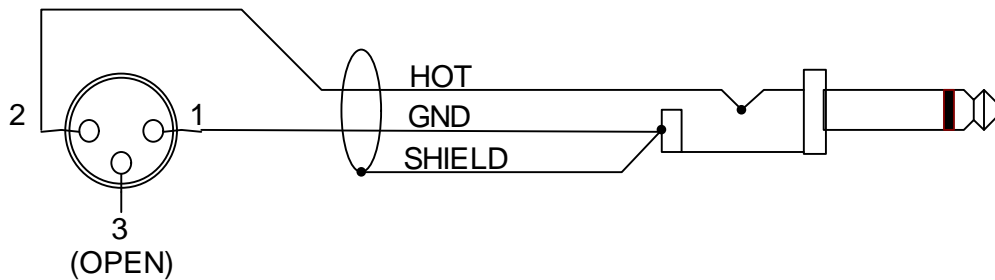
# CONNECTING THE PREAMPLIFIER

## AUDIO CONNECTIONS

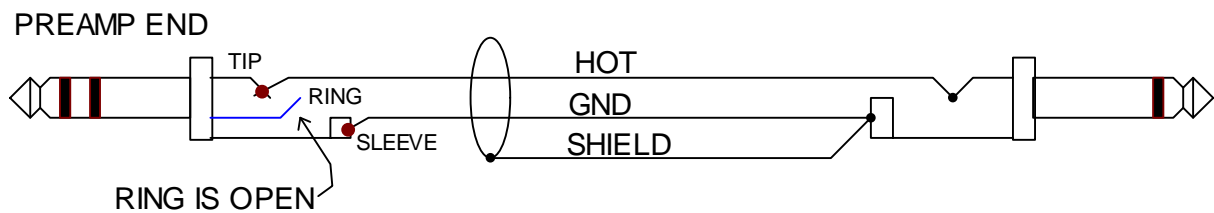
- Microphone input connections are made using the female XLR connector on the rear panel. This connector is wired with pin 2 positive, pin 3 negative and pin 1 ground. 48V phantom power, if used, is supplied on pins 2 and 3.
- Instrument or line input connections are made using the ¼" TRS jack on the front panel. This connector is balanced with the Tip positive, Ring negative and Sleeve ground.
- When a jack is inserted into the instrument input, a sealed gold contact relay switches the preamplifier input source from the mic input connector to the front panel TRS jack. The input impedance of the instrument input is 1M Ohm, which is ideal for inserting high impedance sources such as guitars with passive pickups as well as any instrument with a high level output. Please note that the gain range of the preamplifier when using the instrument input is -10dB to +40dB.
- Using the instrument input with an unbalanced source is simple if a mono ¼" jack is used since the sleeve will automatically ground the inverting input (ring) when plugged in.
- Output connections are made using the male XLR connector or the ¼" TRS jack. The XLR connector is wired with pin 2 positive, pin 3 negative and pin 1 ground. The ¼" TRS connector is balanced with the Tip positive, Ring negative and Sleeve ground. The XLR and TRS outputs can be used simultaneously. **Important-** See figures 1. and 2. for unbalanced cable termination information.
- If either of the outputs are to be used unbalanced, a modified cable is required and pin 3 (or the Ring) should be left open. See figure 2. below.

**NOTE:** *It is not recommended to use an unbalanced ¼" plug in the TRS output jack since the sleeve of the unbalanced plug will short the inverting output amplifier to ground. While this will not cause damage to the preamplifier, it can cause distortion in the unbalanced signal.*

## Cable Termination Diagrams



**Figure 1. XLR UNBALANCED OUTPUT CABLE TERMINATION**



**Figure 2. TRS UNBALANCED OUTPUT CABLE TERMINATION**

## POWER SUPPLY CONNECTIONS

A 2.1mm jack is used for the DC power input of the 101. The polarity of the jack is positive in the center and ground on the outside.

Included with your Model 101 is an AC adapter rated for 6VDC @ 800mA.

# OPERATION

## SETTING THE GAIN

- Turn the gain control fully counter-clockwise, turn the trim control fully clockwise and check that the +48V phantom power is off.
- Connect the microphone to the preamplifier and then turn on the phantom power switch on if required.
- When sending a signal to a recorder that has fixed input levels, simply increase the gain until the optimum recording level is reached.

*When sending a signal to a tape recorder with a variable input, use the following procedure:*

- Turn the gain control fully counter-clockwise, turn the trim control fully clockwise.
- Set the record level control on the recorder to 12 o'clock or midway between minimum and maximum.
- With the sound source present, turn the preamplifier gain control clockwise until the peak LED begins flashing red, then reduce the gain until the red stops flashing.

<p><i>Since red indicates a peak level which is 10dB before clipping, it is OK for it to come on occasionally during recording.</i></p>
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- Adjust the recorder input control for the optimum recording level.

## About the Trim Control

The trim control can be used for fine output level adjustment as well as for level riding during recording. It should be noted that the maximum output level of the preamplifier is reduced by the amount of output attenuation (trim control) being used. For instance, if the trim is set to -6dB, the maximum output level of the preamplifier will drop from +26dBu to +20dBu. Since the LED peak indicator monitors signal level *before* the trim control it, will always monitor the actual preamplifier headroom regardless of the trim control setting. *It is best to leave the trim control fully clockwise for normal recording operations.* This ensures that the preamplifier will be operated at the minimum necessary gain setting.

# Model 101 Specifications

## **GAIN RANGE**

Mic input 5dB steps	10-60dB
Mic input 5dB steps High gain version	20-70dB
Hi-Z input 5dB steps	-10-40dB
Hi-Z input 5dB steps High gain verzision	0-50dB
Output trim attenuator	0 to -10dB

## **THD+N**

@20dB Gain +20dBu out	<0.00085%
@40dB Gain +20dBu out	<0.0010%
@60dB Gain +20dBu out	<0.0050%

## **IMD** (SMPTE/DIN 4:1 7kHz/50Hz)

@40dB Gain +20dBu out	<0.0020
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## **NOISE** (EIN)

50 Ohm source	<-130dB
150 Ohm source	<-128dB
600 Ohm source	<-124dB

## **CMRR**

100Hz	>68dB
1kHz	>75dB
10kHz	>65dB

## **PHASE DEVIATION** (HPF off)

50Hz-25kHz	<6 degrees
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## **FREQUENCY RESPONSE**

Mic input @40dB Gain -3dB	4.5Hz-400kHz
Mic input @40dB Gain -0.5dB	12Hz-170kHz
Hi-Z input @20dB Gain -3dB	3.0Hz-300kHz
Hi-Z input @40dB Gain -0.5dB	7.5Hz-300kHz

## **IMPEDANCE**

Mic input	1600 Ohms
Hi-Z input (unbalanced)	1.0M Ohms
Hi-Z input (balanced)	2.0M Ohms

## **PEAK LED METER**

Green threshold	-20dBu
Red threshold	+16dBu

## **MAXIMUM OUTPUT LEVEL**

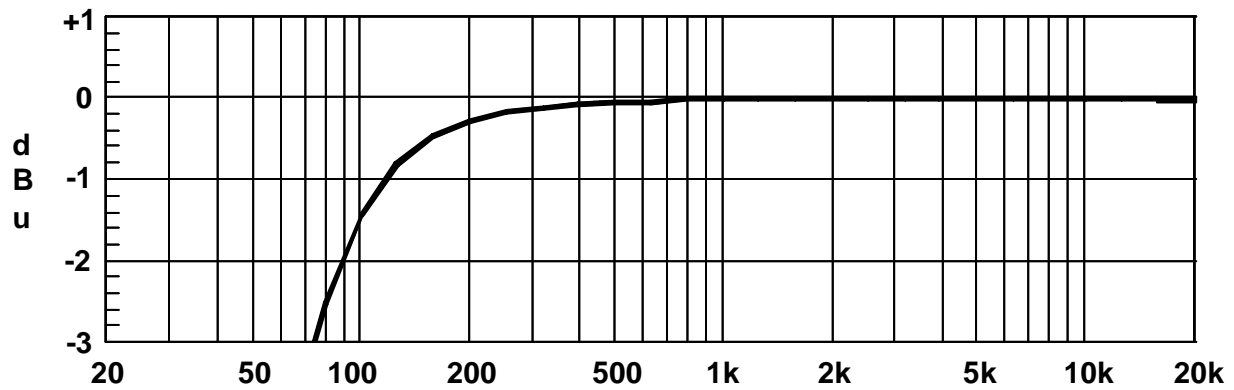
100k Ohm load, 0.1% THD	+25dBu
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## **CROSSTALK**

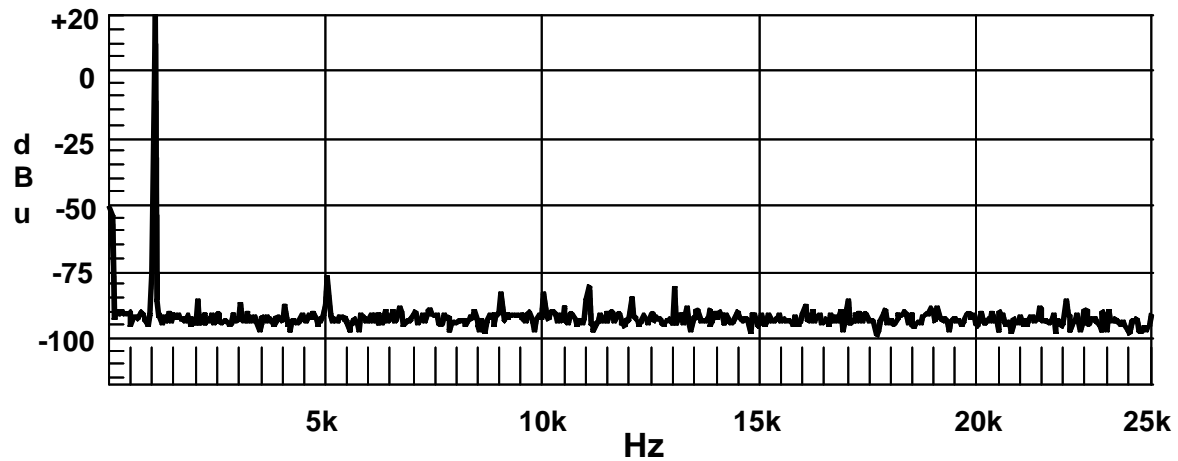
None!



### 75Hz HIGH PASS FILTER RESPONSE

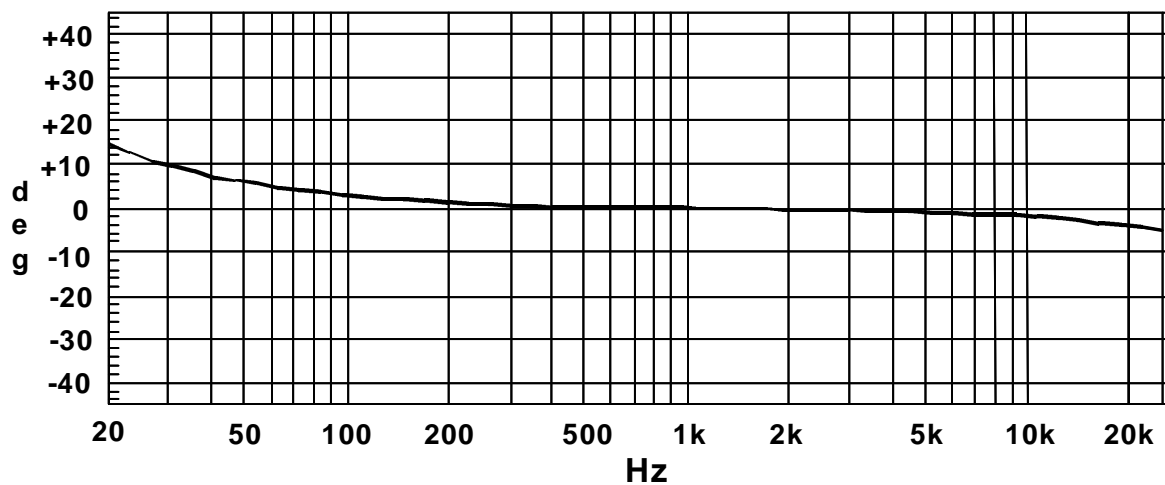


### FFT SPECTRUM ANALYSIS



FFT @40dB gain, +20dBu out

### PHASE vs FREQUENCY



Phase response @10dB gain. 50 Ohm source, 100K Ohm load, HPF Off